

S/110/60/000/011/006/012  
E194/E484

AUTHORS: Blokh, G.A. Candidate of Technical Sciences,  
Ol'shanskiy, L.P., Engineer and Kolobenin, V.N., Engineer

TITLE: The Low-Temperature Vulcanization of Tough Rubber Cable  
Sheaths

PERIODICAL: Vestnik elektropromyshlennosti, 1960, No.11, pp.56-61

TEXT: The comparative characteristics of rubber, polyethylene and polyvinylchloride, given in Table 1, show that if polyethylene cable is sheathed with PVC full advantage is not taken of the low temperature properties of the polyethylene. The cable is accordingly not sufficiently resistant to frost. Accordingly a television signal cable was developed in which the cores were insulated with polyethylene and the sheath was made of natural or chloroprene rubber. A photograph of the cable is given in Fig.1 and the main characteristics in Table 2. As the polyethylene softens at a temperature of 100 to 110°C the vulcanization temperature of the sheath could not exceed 80 to 90°C. The most effective method was found to be hot pressing in a screw press with subsequent vulcanization in a lead sheath. The lead sheath ensured good heat transmission and uniform temperature during Card 1/4 ✓

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#### The Low-Temperature Vulcanization of Tough Rubber Cable Sheaths

vulcanization. New formulations of rubber were used containing higher contents of plasticizers. Tests were made on the vulcanization of mixtures based on natural rubber. A number of ultra-accelerators were studied and are named, the most important being dimethyl dithiocarbamate of zinc, rubber containing from 2 to 3% of dimethyl dithiocarbamate of zinc is effectively vulcanized at a temperature of 80°C in six hours or at 85°C in four hours. For tough rubber sheaths the optimum content of zinc stearate ranges from 4 to 6% and of zinc oxide from 3 to 5% based on the rubber. Rubbers of this formulation meet the requirements of standard ГОСТ 2068-54 (GOST 2068-54)<sup>5</sup> for rubber type PIUM (RShM)<sup>6</sup> in respect of frost resistance and ageing stability. Compounds uniting the properties of dithiocarbamates and amines were found to be very effective accelerators for vulcanization of sheath rubbers at a temperature of 75°C, see data given in Table 3. It will be seen from the data of Table 3 that compounds based on dialkyl-dithiocarbonimic acid and alkyl amines worked individually and in combination with dimethyldithiocarbamate at a temperature

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of 75°C. Fig.3 shows curves of the influence of storage time at 25°C on the plasticity and strength of various rubber mixtures and it is shown that certain of the compounds can be fully vulcanized without heating during 3 to 5 days storage at room temperature. The vulcanization of mixtures based on polychloroprene rubber is then considered. The tests were made on standard sheath mixture type RShM to standard GOST 2068-54 containing 50% of rubber. The combinations of oxides of zinc and magnesium which are usually the best vulcanizing groups for these rubbers cannot ensure vulcanization at temperatures of 75 to 85°C in a reasonable time. Vulcanization tests were accordingly made with a number of substances and their combinations of which the most promising were pyrocatechin zinc chloride, diphenylguanidin, thiuram and hydroquinone. The results of the tests are given in Table 4 and it will be seen that rubbers containing 0.5 to 1% of pyrocatechin have good physical and mechanical properties. The effects of the other additives are discussed. When 0.5% zinc chloride is used in combination with 0.3 to 0.5 pyrocatechin the rubber is of good

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mechanical strength. Vulcanizers containing 0.75 to 1% of hydroquinone have good mechanical characteristics and wide range of vulcanization, see Fig.5, and such rubbers are recommended for use. During the course of the work it was found that if the rubbers did not contain Captax or diphenylguanidin they vulcanized in 5 or 6 hours at a temperature of 80°C without the addition of active accelerators of vulcanization. Mechanical properties of rubber vulcanized in this way were good. On the basis of the formulations that have been developed it is possible to sheath polyethylene insulated cables with rubber, and the rubbers developed can also be used for repairing rubber cable sheaths. There are 5 figures and 4 tables. ✓

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S/153/61/004/005/005/005  
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AUTHORS: Blokh, G.A., Melamed, Ch.L., Ol'shanskiy, L.P. and  
Levitin, Zh.N.

TITLE: Heat and moisture-resistant resins for electrical  
insulation

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i  
khimicheskaya tekhnologiya. v.4, no.5, 1961, 847-853

TEXT: The paper deals with the problem of insulating materials  
which have the required electrical and mechanical properties as  
well as high heat- and moisture-resistance. The present  
investigation is specifically concerned with insulating resins  
subjected to simultaneous heating and cooling on opposite sides  
(140°C and 20°C). The ageing tests were carried out on rubber  
tubing, the outside of which was maintained at 140°C whilst water  
was passed through the inside, the tubing was subsequently cut into  
sample pieces for physical tests. The usual ageing method of  
heating samples in a humidity cabinet by means of warm air proved  
unsuitable, because under normal conditions the heat transfer  
between air and rubber is less than that between water and rubber.  
Electric resistance heating of the tube surface, thermostatically  
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controlled by a thermocouple, was therefore employed for each individual sample. A sketch of the apparatus with some constructional details is given (see figure). The resins based on the following rubbers were investigated: styrene-butadiene CKC-30 (SKS-30), silicone CKC-30ABC (SKS-30ABS), CKC-30AMBC (SKS-30AMBS) obtained by the method developed by A.P. Pisarenko and his associates (Ref.1: Kauchuk i rezina, no.2, 6, (1957)), carboxylated styrene-butadiene SKS-30 obtained by the method developed by B.A. Dolgoplosk and his associates (Ref.2: Kauchuk i rezina, no.6, 1 (1957)), butadiene-methyl vinyl pyridine and butyl rubbers. They were also investigated in combination with each other and with natural rubber, and with chalk, talc, pyrophyllite and powdered silica gel as fillers. The composition of the tested resins is given in detail. The results of the tests are given in Table 2. The best insulating properties were obtained from styrene-butadiene resins. Compounds based on methyl vinyl pyridine and butyl rubber showed insufficient heat- and moisture-resistance as well as unsatisfactory electrical properties. There are 1 figure, 3 tables and 3 references: 2 Soviet-bloc and 1 Russian translation from non-Soviet-bloc

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Heat and moisture-resistant ...

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publication.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskii institut  
im. F.E.Dzerzhinskogo i Berdyanskiy zavod "Azovkabel",  
Kafedra tekhnologii reziny (Department of Rubber  
Technology, Dnepropetrovsk Institute of Chemical  
Technology im. F.E.Dzerzhinskiy and  
Berdyansk "Azovkabel" Plant)

SUBMITTED: May 21, 1960

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*OL'SHANSKIY, L.P.*

34160

S/196/62/000/002/008/023  
E194/E155

N.9300

AUTHORS: Blokh, G.A., Karpov, V.L., Malinskiy, Yu.M.,  
Ol'shanskiy, L.P., and Khloplyankina, M.S.

TITLE: The action of ionising radiation on cable rubbers

PERIODICAL: Referativnyy zhurnal, Elektrotehnika i energetika,  
no.2, 1962, 14, abstract 2B 79. (Vestn.  
elektroprom-sti<sup>32</sup> no.8, 1961, 52-58).

TEXT: Cable rubbers and cable constructions were subjected to gamma radiation from Co<sup>60</sup> in a source with an output of 21 000 g-equiv.rads. The specimens were irradiated to a dosage of 0.3 Mrad/hour. Radiation was found to cause some chemical changes in cable rubber which progressively impaired its physical, mechanical and electrical properties. Radiation doses up to 50-100 Mrads on specimens in vacuum or immersed in water, causes smaller change in the properties of rubber than does irradiation in air. This indicates that oxygen participates actively in the processes that occur in rubber subjected to ionising radiation. On the simultaneous application of temperatures up to 70 °C and  
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radiation for a period of 70 hours, rubber grade TC-35 (TS-35) was more stable than grade WH-40 (ShN-40). Dosages above 100 Mrads caused complete breakdown of rubberised cloth. Graphs are given of changes in the physical-mechanical and electrical properties of various cable-insulating rubbers subjected to ionising radiation. 7 illustrations, 6 literature references.

[Abstractor's note: Complete translation.]

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S/844/62/000/000/099/129  
D234/D307

AUTHORS: Blokh, G. A., Karpov, V. L., Malinskiy, Yu. M., Ol'shanskiy, L. P. and Khloplyankina, M. S.

TITLE: The effect of ionizing radiations on cable rubbers and structures

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 581-588

TEXT: Specimens were irradiated by a Co<sup>60</sup> source. Up to a dose of 50 megarad the properties of rubbers changed relatively little. At higher doses, relative elongation decreases to less than a third and strength diminishes. Above 100 megarad complete destruction of rubberized fabric in cables is observed. In insulating rubbers strength decreases considerably, especially with 200 megarad. An increase of the dose to 350 megarad increases the strength again. In hose rubber *ИИ-40* (ShN-40) strength drops by 25 - 30% with 50 - 100 megarad, but between 100 and 300 megarad it became higher than

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initial strength. Hardness increased with the dose. Relative elongation was below GOST standards for doses higher than 50 megarad. Properties of rubbers placed in water or in vacuum (with 50 - 100 megarad) change much less than those of rubbers placed in air, which indicates the participation of oxygen in the processes caused by irradiation. Insulation rubber TC-35 (TS-35) was more stable than hose rubber ShN-40 when subjected simultaneously to 70°C and 0.7 megarad/hour during 70 hours. Electrical insulating properties of all rubbers were below GOST standards beginning with 50 megarad. There are 3 figures and 3 tables.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskii institut im. F. E. Dzerzhinskogo (Dnepropetrovsk Institute of Chemical Technology im. F. E. Dzerzhinskiy), Fiziko-khimicheskii institut im. L. Ya. Karpova, Zavod "Azovkabel" (Physico-Chemical Institute im. L. Ya. Karpov, "Azovkabel" Factory)

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32(3)

SOV/112-59-3-5086

Translation from: Referativnyy zhurnal. Elektrotehnika, 1959, Nr 3, p 111 (USSR)

AUTHOR: Ol'shanskiy, M. A.

TITLE: Construction and Production of Prestressed Reinforced-Concrete Ties and Contact-Wire Poles (Konstruktsiya i tekhnologiya proizvodstva zhelezobetonnykh shpal i opor kontaktnoy seti s predvaritel'no napryazhennym armirovaniyem)

PERIODICAL: Sb. dokl. na Nauchno-tekhn. konferentsii po vopr. novoy tekhn. v str-ve i ekspluatatsii tramvayn. putey v g. Kiyev, 1956, Kiyev, 1957, pp 16-24

ABSTRACT: After a five-year experimental operation, the Kiev streetcar system adopted a trihedral reinforced-concrete pole with stiffening ribs; the pole is hollow inside for accommodating the lighting cable. A reinforcement of strong 2.5-mm steel wire is placed in each pole face. Grade "500" concrete is used for poles and ties. The poles are produced by a simple "stand" line method that does not require expensive special equipment. A detailed description of the production process and major equipment involved is presented. Drawings of poles and ties are supplied, as well as a plan of the department for tubular-concrete production.

Card 1/1

T.A.K.

SOV/137-57-10-19006

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 10, p 81 (USSR)

AUTHORS: Frantsevich, I.N., Fedorchenko, I.M., Radomysel'skiy, I.D.,  
Barabash, M.L., Ol'shanskiy, M.A., Nichiporenko, O.S.

TITLE: Wear-resistant Iron Powder Contact Inserts for Trolleybuses  
(Iznosostoykiye metallokeramicheskiye zheleznyye tokopri-  
yemnyye vstavki dlya trolleybusov)

PERIODICAL: V sb.: Povysheniye iznosostoykosti i sroka sluzhby mashin.  
Kiyev - Moscow, Mashgiz, 1956, pp 304-312

ABSTRACT: A description is presented of iron-and-graphite cermet con-  
tact inserts (ICI) for trolleybuses. The ICI are made from a  
mixture of Fe and graphite (G) powders compacted cold and  
then sintered in a shielding or inert atmosphere. The G acts  
as lubricant between the rubbing surfaces of the ICI and the  
contact wire. The ICI operate at current densities of up to  
60 amps/cm<sup>2</sup>, 500 v potential, and a pressure of 2-3 kg/cm<sup>2</sup>.  
It is pointed out that ICI undergoes less wear than does a cop-  
per-and-graphite substance, but that the trolley contact wires  
are exposed to greater wear. It is found that the G content has  
a pronounced effect on the wear resistance of the ICI.

Card 1/2

OL'SHANSKIY, M.

The production and putting into operation of wire reinforced  
concrete ties for street railways. Zhil.-kom. khoz. 7 no.6:11-14  
'57. (MIRA 10:10)

1. Glavnyy inzhener Kiyevskogo tramvaynotrolleybusnogo upravleniya.  
(Reinforced concrete)  
(Street Railways)  
(Railroads—Ties)

REBROV, Sergey Alekseyevich,; BORODAVKA, A.S., inzh., retsenzent,; DENISENKO,  
I.P., inzh., retsenzent,; OL'SHANSKIY, M.A., inzh., retsenzent,;  
SHPOLYANSKIY, M.B., inzh., retsenzent,; ALEKTOROV, V.A., kand. tekhn.  
nauk, red.; SERDYUK, V.K., inzh., red.

[Trolley buses] Trolleibussy, Kiev, Gos. nauchno-tekhn. izd-vo  
mashinostroit. lit-ry, 1958. 278 p. (MIRA 11:11)  
(Trolley buses)

OL'SHANSKIY, M.A.

probably

OL'SHANSKIY, A.M. (Same as M.A.) "Selection and Seed Growing in the Agriculture of Southern Ukrainian SSR."

SO: V.SB: Materialy Vsesoyuz. Soveshchaniya Nauch-Issled. Uchezhdeniy Po Sel. Khoz-VV. 1945 g. M., 1948, pp. 38-50.

OL'SHANSKIY, M.A.

"Introducing a Grade of Cotton Plant - Odesskiy #1".

SO: V. SB Nauch Trudy Vsesoyuz. Selektiv. - Genet. In-ta im Lyenko. M., 1949, pp. 183-196.

OL'SHANSKIY, Mikhail Aleksandrovich

"In Memory of Petr Fedorovich Plesetskiy," *Agrobiologiya*, 4, 1949.

OL'SHANSKIY, M.A.

"The Cluster Method of Planting Timber Belts at the All-Union Selection Genetics Institute," Agrobiologiya, 6, 1949.

OL'SHANSKIY, M. A.

21852 OL'SHANSKIY, M. A., KIRICHENKO, F. G. i BARENITSA, Ye. T. O metodakh  
vyrashchivaniya porodno uluchennykh semyan ality. Seleksiya i  
semenovodstvo, 1949, No. 7, s. 27-35.

SO: Letopis' Zhurnal'nykh Statey, No. 29, Moskva, 1949

OL'SHANSKIY, M. A. Akademik

USSR(600)

Afforestation, Oak

Principle results of experimental spot seeding of oak carried out in 1949.  
Abrobiologia No. 1, 1952.

Three years of practice on  $\gamma$  spot seeding of oak.  
Les step No. 2, 1952.

Monthly List of Russian Accessions, Library of Congress, June 1952. UNCL.

USSR/Biology, Agriculture - Hybrid Sep/Oct 52  
dization

"Theoretical Foundations of the Method of Inter-  
variety Hybridization of Plants Under Conditions  
of Free [Natural] Pollination," M. A. Olehan-  
skyy, All-Union Acad of Agr Sci imeni Lenin

"Agrobiologiya" No 5, pp 9-22

This is an exhaustive presentation of methods  
proposed by T. D. Lysenko for improving the  
quality of crops produced by hybridization of  
plants. It is based on the assumption that  
"the organism does ~~not~~ assimilate the condi-  
tions of any outside environment, but <sup>only</sup> of

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those that correspond to its heredity." Dis-  
cusses in detail conditions under which self-  
pollination, intravariety pollination, and  
intervariety pollination are of advantage or  
disadvantage. Expts and research in this field  
are carried out by the Selection [and] Genetics  
Inst imeni T. D. Lysenko where considerable  
data have been accumulated on wheat, rye, barley,  
corn, sunflowers, and cotton.

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OLSHANSKIY, M. A.

1. OL'SHANSKIY, M. A.
2. USSR (600)
4. Agriculture
7. Unprecedented abundance. Znan. sila, No. 10, 1952

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.

1. OL'SHANSKIY, M. A.
2. USSR (600)
4. Plant Breeding
7. Plant breeding. Sel. 1 sem. 20, No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, May 1953. Unclassified.

OL'SHANSKIY Mikhail Aleksandrovich.

More corn from the non-Chernozem zone Moskva Goskul'tprosvetizdat, 1955. 7 p.

USSR/Forestry - Forest Cultivation

K-5

Abs Jour : Ref Zhur - Biol., No 9, 1958, 39117

Author : Ol'shanskiy, M.A., Zeldman, D.P., Zheleznov, G.F.

Inst :

Title : Progress in Theory and Practice of Field Protection of Forest Cultivation. (Results Produced by Cluster Planting of Oak in Experiment Institutions after a Period of 8 Years).

Orig Pub : Agrobiologiya, 1957, No 4, 79-108.

Abstract : The state of oak cluster planting on 458 forest strips (laid in 1949 and 1950), according to data obtained from 64 experiment agricultural institutions, is described. The forest strips are located in 30 oblasts of the RSFSR, Ukraine and Moldavia. It is indicated that no deterioration in the quality of plantations, based on the growth of the intra species rivalry was noticed.

Card 1/2

OL'SHANSKII, M. A. Agricultural problems in  
arid regions and the ways and means of increasing  
the yield of agricultural crops. (In Russian.)  
Vest. Sel'skokhoz. Nauki 3(11):3-14. Nov.1958.  
20 V633  
Agronomy.

OL'SHANSKIY, M.A., akademik

Tenth anniversary of the August session of the Lenin All-Union Academy of Agricultural Sciences. Agrobiologiya no. 3:3-18 My-Je '58. (MIRA 11:7)

1. Vitsesprazident Vsesoyuznoy ordena Lenina akademii sel'sko-khozyaystvennykh nauk imeni V.I.Lenina.  
(Biological research)  
(Plant breeding)

OL'SHANSKII, M. A. Problems in steppe farming and ways of increasing the productivity of agricultural crops. (In Russian.) (Extr.) Sel'sk. Khoz. Povolzh'ia 4(11):19-27. Nov.1958. 20 Sel478 Agronomy.

DOBRYNIN, V.P., prof.; OL'SHANSKIY, M.A., akademik, lektor; YELIN, Ye.Ya., dots.; FAT'YANOV, A.S., prof.; GUBAREV, A.N.; TKACHENKO, P.I., dots.; GHIZHEVSKIY, M.G., prof., lektor; AVDONIN, N.S., prof., lektor; ONUCHAK, A.I., dots.; DUNIN, M.S., prof., lektor; SAVZDARG, E.E., prof., lektor; KREMENTSKIY, N.D., dots., lektor; AVER'YANOV, S.F., dots., lektor; POLUBOYARINOV, I.I., dots.; GUBAREV, A.N., red. izd-va; NAUMOV, K.M., tekhn. red.

[Textbook on agriculture for party schools] Uchebnoe posobie po sel'skomu khoziaistvu dlia partiinykh shkol. Moskva. Pt.1. [Crop farming] Zemledelie. 1958. 397 p.  
(MIRA 15:1)

1. Kommunisticheskaya partiya Sovetskogo Soyuz. Vysshaya partiynaya shkola. 2. Vysshaya partiynaya shkola pri Tsentral'nom komitete Kommunisticheskoy partii Sovetskogo Soyuz (for Dobrynin, Ol'shanskiy, Gubarev, Tkachenko, Ghizhevskiy, Avdonin, Onuchak, Dunin, Savzdarg, Kremenetskiy, Aver'yanov). 3. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk im. V.I.Lenina (for Ol'shanskiy).
4. Vysshaya partiynaya shkola pri Tsentral'nom komitete Kommunisticheskoy partii Ukrainy (for Yelin, Poluboyarinov). 5. Gor'kovskaya Vysshaya partiynaya shkola (for Fat'yanov).  
(Agriculture)

LYSENKO, T.D.; OL'SHANSKIY, M.A.; SINYAGIN, I.I.; GLUSHCHENKO, I.Ye.;  
VARUNTSYAN, I.S.; PREZENT, I.I.; SHCHERBINOVSKIY, N.S.; SHUNKOV,  
V.I.; YEVSTIGNEYEV, S.M.; BOCHEVER, A.M.; LITVIN, V.M.; YAYKOVA,  
A.T.; PODVOYSKIY, I.I.; SAKS, Ye.I.; KHALIFMAN, I.A.; FEYGINSON,  
N.I.; SHCHEGLOVA, Yu.N.; DLUGACH, G.V.; STERNIN, R.A.; LISOVSKAYA,  
O.V.; GUBINA, T.I.; ROZENFEL'D, M.I.; TSVETAYEVA, Ye.M.; PARKHO-  
MENKO, Ye.V.; NEYMAN, N.F.

Sofia Iakovlevna Voitinskaia; an obituary. Agrobiologiya no.4:121  
Jl-Ag '58. (MIRA 11:9)  
(Voitinskaia, Sofi'ia Iakovlevna, 1898-1958)

LOBANOV, P.P.; BREZHNEV, D.D.; LYSENKO, T.D.; BOREV, G.A.; OL'SHANSKIY, M.A.;  
SINYAGIN, I.I.; ALEKSASHIN, V.A.; AVDONIN, N.S.; BEBEZOVA, Ye.P.  
SOKOLOV, N.S.; SOTNIKOV, V.P.; SMIRNOV, N.D.; KEDROV-ZIKMAN, O.K.

Ivan Il'ich Samoilov; obituary. Dokl. Akad. sel'khoz. 23 no. 11:  
48 '58. (MIRA 11:12)  
(Samoilov, Ivan Il'ich, 1900-1958)

OL'SHANSKIY, M.A ; ZEL'MAN, D.P.

Experience of ten years in planting oak in clusters. Agrobiologia  
no.5:713-734 S-O '60. (MIRA 13:10)

(Oak)

*OLSHANSKIY M. A.*  
OLSANSKIJ, M.A., akademik

Creative role of natural selection. Vestnik CSAZV 7 no.1/2:46-50  
• 60. (EEAI 9:7)

1. Prvni mistopredseda VASCHNIL  
(Natural selection)

OL'SHANSKIY, M.A.

Tasks of agricultural research. Agrobiologiya no. 5:643-672  
S-O '61. (MIRA 14:10)

1. Ministr sel'skogo khozyaystva SSSR.  
(Agricultural research)

OL'SHANSKIY, M.A.

Four questions to the president of the All-Union Academy of  
Agricultural Sciences. Nauka i zhizn' 29 no.6:5-7 Ja '62.  
(MIRA 15:10)

1. President Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk  
imeni Lenina (Conclusion).  
(Agricultural research)

OL'SHANSKIY, M.A., akademik

Tasks of the Lenin All-Union Academy of Agricultural Sciences in carrying out the resolutions of the Central Committee of the CPSU and the Council of Ministers of the U.S.S.R. on measures for further development of biological science and the strengthening of its ties with practice. Agrobiologiya no.3:324-345 My-Je '63. (MIRA 16:7)

1. Prezident Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk imeni V.I.Lenina.

(Agricultural research)

OL'SHANSKIY, M.K.; SHPIGUN, G.B.

Reinforced concrete pits for slow metal cooling. Metallurg 7  
no.9:20-21 S '62. (MIRA 15:9)

1. Prokatnyy tsekh No.1 Chelyabinskogo metallurgicheskogo zavoda.  
(Furnaces, Heating)

ABDULIN, A.; ALEKSEYEV, I.; BANTIE, O.; BOBROV, L.; BOZHANOV, B.;  
 BOYKO, V.; BONDAREV, K.; BORZOV, V.; VERKHOVSKIY, N.; GUBAREV, V.;  
 GUSHCHEV, S.; DEBABOV, V.; DIKS, R.; DMITRIYEV, A.; ZHIGAREV, A.;  
 ZEL'DOVICH, Ya.; ZUBKOV, B.; IRININ, A.; IORDANSKIY, A.;  
 KITAYGORODSKIY, P.; KLYUYEV, Ye.; KLYACHKO, V.; KOVALEVSKIY, V.;  
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 MALEVANCHIK, B.; MANICHEV, G.; MEDVEDEV, Yu.; MEL'NIKOV, I.;  
 MUSLIN, Ye.; NATARIUS Ya.; NEYFAKH, A.; NIKOLAYEV, G.; NOVOMEYSKIY, A.;  
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 RESHETOV, Yu.; RYBCHINSKIY, Yu.; SVOREN', R.; SIFOROV, V.; SOKOL'SKIY, A.;  
 SPITSYN, V.; TEREKHOV, V.; TEPOV, L.; KHAR'KOVSKIY, A.; CHERNYAYEV, I.;  
 SHAROL', L.; SHIBANOV, A.; SHIBNEV, V.; SHUYKIN, N.; SHCHUKIN, O.;  
 EL'SHANSKIY, I.; YUR'YEV, A.; IVANOV, N.; LIVANOV, A.; FEDCHENKO, V.;  
 DANIN, D., red.

[Eureka] Evrika. Moskva, Molodaia gvardiia, 1964. 278 p.  
 (MIRA 18:3)

OLSHANSKIY, N. B.

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AUTOMATIC WELDING WITH CARBON ELECTRODES AND FLUXING POWDER. N.A. Olschanskyj. (Avtegennoe Delo, 1948, no 3, PP 16-18; (Abstract) Svarovani, 1948, no 5). A method of automatic welding with carbon electrodes has been developed and the welding process takes place under a layer of flux in powder form. The arc does not blow the powder about. It is stable with A.C. even if the current values are low, and it is thus possible to weld thin sheets. Welding speed is three to five times higher than the speed obtained with standard methods. The electrode holder is of special design giving control of the length of the arc, and the clamping device is suitable for butt, lap, and seam welding. The current is supplied by welding transformers or by D.C. welding sets. Consumption of electrode material with A.C. is about twice as high as with D.C. with correct polarity, and if the D.C. polarity is reversed the electrode consumption is increased to five times the normal value. Fluorspar, ferrosilicon, and ferromanganese are added to the flux and special fluxes in powder form are provided for non-ferrous metals. Welding experiments were carried out for low-carbon sheets 2 mm thick without using filler rods, and the current consumption was determined for butt, lap, and seam welding for various welding speeds. E.G.



OL'SHANSKIY, N. A.

OL'SHANSKIY, N. A. -- "New Method of Welding and Construction of Automatic Machines." Sub 11 Feb 52, Moscow Order of Labor and Pioneer Higher Technical School Imeni Bauman. (Dissertation for the Degree of Candidate in Technical Sciences).

SO: Vechernaya Moskva, January-December 1952

OL'SHANSKIY, N. A.

USSR/Engineering - Welding, Methods

Feb 52

"Automatic Welding of Brass With Steel," N.A.  
Ol'shanskiy, Engr

"Avtogen Delo" No 2, pp 7-10

Describes method developed at welding laboratory 1)  
of MVTU imeni Bauman for automatic carbon-arc  
welding of bimetallic bedways for machine tools.  
Discusses fluxes and electrodes, and describes  
welding equipment, indicating that industrial ap-  
plication of method is 1st expt for utilization  
of automatic arc welding for joining unlike metals.  
Up to 50% conservation of nonferrous metal may be  
achieved by replacing all-brass bedways with bi-  
metallic ones. 212T19

1. OL'SHANSKIY, N. A.
2. USSR(600)
4. Welding
7. Conductivity of the arc interval in welding under flux, Aviog. delo, 24, No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, April, 1953, Uncl.

ABDULLAYEV, M.K.; OL'SHANSKIY, N.A., kandidat tekhnicheskikh nauk, redaktor;  
GLADIKH, N.N., tekhnicheskii redaktor

[Safety engineering for welding] Tekhnika bezopasnosti pri proizvod-  
stve svarochnykh rabot. 2-e perer. i dop. izd. Moskva, Gos. izd-vo  
obor. promyshl., 1954, 155 p. (MLRA 8:5)  
(Welding--Safety measures)

YAKOBSON, Sergey Sergeyevich; OL'SHANSKIY, N.A., redaktor; LARIONOV,  
G.Ye., tekhnicheskiy redaktor.

[Welding in the installation and repair of electric power station  
equipment] Svarka pri montazhe i remonte oborudovaniia elektro-  
stantsii. Moskva, Gos.energ.izd-vo, 1955. 319 p. (MLRA 8:12)  
(Welding)

SOV/112-57-6-12513

Translation from: Referativnyy zhurnal. Elektrotehnika, 1957, Nr 6, p 129 (USSR)

AUTHOR: Ol'shanskiy, N. A.

TITLE: Automatic Welding of Copper and Various Metals  
(Avtomaticheskaya svarka medi i raznorodnykh metallov)

PERIODICAL: V sb.: Avtomatizatsiya tekhnol. protsessov v mashinostr. M.,  
AS USSR, 1955, pp 229-236

ABSTRACT: Bibliographic entry.

Card 1/1

OL'SHANSKIY, N.A., kandidat tekhnicheskikh nauk; MORDVINTSEVA, A.V.,  
kandidat tekhnicheskikh nauk.

Automatic arg deposition of brass on steel. [Trudy] MVTU no.37:  
136-144 '55. (Brass plating) (MIRA 9:6)

OL'SHANSKIY, N. A.

137-58-1-813

Translation from: Referativnyy zhurnal Metallurgiya, 1958, Nr 1, p 118 (USSR)

AUTHORS: Ol'shanskiy, N. A., Mordvintseva, A. V.

TITLE: Methods of Improving the Properties of the Weld in Low-Alloy Bronzes (Nekotoryye metody uluchsheniya svoystv metalla shva nizkolegirovannykh bronz)

PERIODICAL: V sb.: Prochnost' i avtomatizatsiya svarki (MVTU, 71).  
Moscow, Mashgiz, 1957, pp 74-92

ABSTRACT: A study is made of the effect of heat-treatment during peening and of alloying upon the quality of welded compounds of Cu and of low-alloy bronzes, as well as of automatic carbon arc flux welding upon the mechanical properties of the weld metal at elevated temperatures. It was found that the nature of the crystallization of the weld can be controlled by changing the type of backing material used in welding Cu. Welding over a cooled graphite Cu backing provides better crystallization of the weld and superior mechanical properties. Heat treatment alone does not guarantee that welds will be of the required properties. The best changes in macro- and microstructure and improvement in hardness properties of welded joints are

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137-58-1-813

## Methods of Improving the Properties of the Weld (cont.)

obtained by peening joints immediately after welding, followed by quenching and aging ( $\sigma_b$  35.1 kg/mm<sup>2</sup>,  $\delta$  25.6 percent). An investigation of the effect of various alloying elements on the mechanical properties and macro-structure of the weld metal showed that the best results were obtained by adding Si-Mn bronze KMts 3.5-1, while Mn (0.44 percent), Zn (1.9 percent), Ag (0.19 percent), and Al (0.5 percent) also facilitated modification of the structure. It is assumed that the cause of hot cracks is liquation of low-melting impurities along the boundaries of the dendrites, whereas reduction in the welding current per unit length will reduce the danger of crack formation. It has been found that reduction in welding current per unit length improves the mechanical properties of welded joints at high temperatures.

G.N.

1. Bronze--Heat treatment    2. Bronze--Welding    3. Welded joints--Peening

Card 2/2

OL'SHANSKIY, N. A. (Cand. Tech. Sci.) (Docent)

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"Automatic Unit for Arc Welding With a Nonconsumable Electrode in a Shielded Atmosphere and Having a Supply of Filler Metal," p. 161 in book Reports of the Interuniversity Conference on Welding, 1956. Moscow, Mashgiz, 1958, 266pp.

SOV-125-58-10-9/12

AUTHORS: Ol'shanskiy, N.A., Mordvintseva, A.V., and Krumbol'dt, M.N.

TITLE: The Use of Ultrasound in Seam and Spot Welding (Ispol'zovanie ul'trazvuka dlya shovnoy i tochechnoy svarki)

PERIODICAL: Avtomaticheskaya svarka, 1958, Nr 10, pp 76 - 77 (USSR)

ABSTRACT: The authors present information on investigations carried out, together, with Engineers L.V. Karaseva and Yu.N. Zorin, by MVTU and MEI on the use of ultrasound in welding practice, and on the first results obtained in this field. The information includes descriptions of the experimental devices, i.e. a machine for ultrasonic spot welding, the basic part of which is a magnetostriction converter (Figures 1,2) and a machine for ultrasonic seam welding, the basic parts of which are a magnetostriction converter and a waveguide. To obtain a concentrated source of ultrasonic oscillations, waveguides of different design were tested (stepped, conic exponential and catenoid shapes). Best results were obtained with waveguides of exponential shape. Tests were performed on ultrasonic spot welding of aluminum and its

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SOV-125-58-10-9/12

The Use of Ultrasound in Seam and Spot Welding

alloys up to a thickness of 1.5 mm and of plastics up to 0.8 mm in thickness. Welding of similar and different metals (aluminum with copper, copper with stainless steel, etc.) was successfully performed. It was stated that soft metals are easier to weld than hard metals. Special tests were carried out to determine maximum temperatures produced by ultrasonic oscillations in different metals under different pressure. It was stated that metal properties and pressure affect the character of the thermal cycle and the maximum temperature values. Investigations of the strength of spot and seam welded joints proved that

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The Use of Ultrasound in Seam and Spot Welding

SOV-125-59-10-9/12

the strength of weld joints depends on the duration of the ultrasonic oscillation passage and on the electrode pressure. In all cases of seam welding, the strength of the weld joint exceeded that of the base metal. There are 3 sets of photos, 2 diagrams and 2 graphs.

ASSOCIATION: MVTU imeni Bauman and MEI

SUBMITTED: April 18, 1958

1. Metals--Welding 2. Plastics--Welding 3. Ultrasonic radiation--Applications 4. Welds--Effectiveness

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SOV/125-58-11-4/16

AUTHORS: ~~Ol'shanakiy, N.K.~~ Mordvintseva, A.V., Zorin, Yu.N., and Kachalov, V.M.

TITLE: Chambers with Controlled Atmosphere for Welding Active Metals (Kamery s kontroliruyemoy atmosferoy dlya svarki aktivnykh metallov)

PERIODICAL: Avtomaticheskaya svarka, 1958, Nr 11, pp 32-36 (USSR)

ABSTRACT: The MVTU and MEI welding laboratories, under the supervision of Professor G.A. Nikolayev, designed hermetic chambers filled with inert gas for the fully mechanized welding of zirconium, molybdenum, titanium, etc. The use of automatic welding heads inside the chambers ensures a most accurate control of the arc voltage, and the welding process is controlled from a special desk. The following devices are described in detail: 1) an installation for welding in controlled atmosphere consisting of a chamber, a prevacuum pump, a control desk and a vacuummeter (Fig. 1) for welding specimens up to 300 mm length; 2) an installation for the welding, in controlled atmosphere, of large-size specimens with the use of a movable welding head and a vacuum line with a pump system. Contrary to foreign

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SOV/125-58-11-4/16

Chambers with Controlled Atmosphere for Welding Active Metals

models, the electric motors are placed inside the chamber, thus simplifying the welding process and permitting the design of large-size chambers. Zirconium and molybdenum specimens were successfully welded in the described installations. There are 3 photos and 1 circuit diagram.

ASSOCIATION: MVTU imeni Baumana i MEI (MVTU imeni Bauman and MEI)

Card 2/2

OLSHANSKIY N. A.

PHASE I BOOK EXPLOITATION 307/3528

Moscow. Dom nauchno-tekhnicheskoy propagandy

Primeneniye ul'trazvuka v promyshlennosti; sbornik statey (Industrial Use of Ultrasound; Collection of Articles) Moscow, Mashgiz, 1959. 301 p. 8,000 copies printed.

Sponsoring Agency: Obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy RSFSR.

Ed. (Title page): V.F. Mozdrev, Doctor of Physical and Mathematical Sciences, Professor; Ed. (Inside book): G.F. Kochetova, Engineer; Tech. Ed.: V.D. El'kind; Managing Ed. for literature on Machinery and Instrument Manufacturing (Mashgiz): N.V. Pokrovskiy, Engineer.

PURPOSE: This book is intended for engineers and technicians engaged in the application of ultrasonics in machinery manufacture and in other branches of industry.

COVERAGE: This is a collection of papers read at the first all-Union conference on the use of ultrasonics in industry. Attention is focused mainly on the description of ultrasonic equipment and on the use of ultrasound for the machining of hard materials and for flaw detection. The effect of ultrasound on metal-crystallization processes is also discussed. No personalities are mentioned. References accompany many of the papers.

Grekov, N.A. Methods of Industrial Quality Control of Metal for Turbogenerator Motor Forgings ("Elektrosila" Plant imeni S.M. Kirov)

Ponomarenko, Yu.V., Engineer. Ultrasonic Generators Developed at the DOR'kiy Avtomob (Dor'kiy Motor-Vehicle Plant)

Olehanov, N.A., Candidate of Technical Sciences; and A.Y. Mordvinov, Candidate of Technical Sciences. Applications of Ultrasound in Welding

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274

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*Ol Shansky, Nikolay Aleksandrovich*

RADUNSKIY, Lev Davydovich; KHRENOV, Konstantin Konstantinovich, akademik;  
retsensent; OL'SHANSKIY, Nikolay Aleksandrovich, red.; LARIONOV,  
G.Ye., tekhn.red.

[Technical development of electric arc welding of metals in  
Russia] Razvitie tekhniki elektricheskoi dugovoi svarki metallov  
v Rossii. Moskva, Gos.energ.izd-vo, 1959. 167 p. (MIRA 12:4)

1. AN USSR, chlen korrespondent AN SSSR (for Khrenov).  
(Electric welding)

SOV/122-59-4-14/28

AUTHORS: Nikolayev, G.A., Meritorious Scientific & Technical Worker, Doctor of Technical Sciences, Professor, and Ol'shanskiy, N.A., Cand. Technical Sciences, Docent

TITLE: The Application of Ultra-Sound in Welding (Primeneniye ul'trazvuka pri svarke)

PERIODICAL: Vestnik Mashinostroyeniya, 1959, Nr 4, pp 51-55 (USSR)

ABSTRACT: The use of ultrasonic vibrations in spot and seam welding is shown diagrammatically. A magnetostriction transducer is excited by a coil supplied from an electrical generator at ultrasonic frequency. The mechanical vibrations produced are transmitted to a conical or similar wave guide as longitudinal waves. One of the electrodes of a spot welding unit is attached transversely at the tip of the cone. The longitudinal vibrations of the cone produce shear stresses in the joined sheets pressed together between the two electrodes. An installation for seam welding on similar principles has been developed at the Moskovskoye Vyssheye Tekhnicheskoye Uchilishche (Moscow Higher Technical College) and the Moskovskoy Energeticheskiy Institut (Moscow Power Institute). A concentrated short period heating up

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SOV/122-59-4-14/28

The Application of Ultra-Sound in Welding

takes place, caused by the plastic deformations due to the shear stresses associated with friction forces. Local crystals are formed in the boundary zone. Apparently, the elevated temperature assists the inter-diffusion between the two components. The welding takes place without fusion. The temperature is the higher, the greater the heat conductivity of the material, e.g. 600 °C in copper alloys and 400 °C in aluminium. Tests with stainless steel of 0.1 mm thickness (Fig 3) show an increasing shear strength of the joint with increasing electrode pressure. A joint is formed in less than 1 second. With 1 mm thick aluminium alloy sheet, the process takes about 0.5 sec. Joints between different metals have been made, in particular aluminium and copper. Ultrasonic spot welding requires no previous cleaning of the metal surfaces, it causes little plastic deformation around the spot and changes the properties of the parent metal least. At present, the maximum wall thickness is limited to 3 mm. Some applications are considered. In the same manner, the welding of plastics has been successfully achieved. An experimental

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The Application of Ultra-Sound in Welding

installation is illustrated (Fig 4). The physical nature of the process is still being studied. Thicknesses up to 10 mm can be welded. Residual stresses in fusion welding of steel have been shown to vary in time owing to the disintegration of residual austenite. This disintegration has been arrested either by high temperature heat treatment, by caulking the seam and by sub-zero treatment. Specimens in the form of slotted rings of 20 KhGSA steel of 3.2 mm diameter, were deformed after the welding of the edges. Argon arc welding with a tungsten electrode was used. Ultrasonic vibrations of 20 kcps were applied to the specimen. Treating the welded joint region over a width of 6-12 mm reduced the degree of deformation with time by a factor of 2. Similar effects were discovered in structures. The effect of ultra-sound on the crystallization of the welding pool in fusion welding was confined in medium carbon steel to an increase of 80% in tension strength under impact. In stainless and other chromium steels

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no appreciable change in micro-structure was observed.

The Application of Ultra-Sound in Welding

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The joint density in argon arc welding of aluminium alloys was improved by ultra-sound.  
There are 5 figures and 2 tables.

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25(1)

SOV/135-59-5-2/21

AUTHOR: Mordvintseva, A.V., Candidate of Technical Sciences, Ol'shan-  
skiy, N.A., Candidate of Technical Sciences

TITLE: Methods of Welding Active Metals

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 5, pp 4-7 (USSR)

ABSTRACT: Work was carried out on methods of welding active metals in the MVTU and MEI under the direction of Professor G. A. Nikolayev, Honored Scientist and Engineer, Corresponding Member of the Akademiya stroitel'stva i arkhitektury (Academy of Construction and Architecture), Doctor of Technical Sciences. Engineers Yu. N. Zorin and V. M. Kachalov also took part in the work, in which two methods were examined: 1) welding in a protective gas medium; 2) welding in a vacuum with an electron beam. Arc welding in inert gases was tried first with an automatic head with an infusible electrode developed by MEI; with this method it was possible to weld longitudinal seams of tantalum tubes with walls 0.2 mm thick and a diameter of 18 mm; however, it was impossible to weld other active and infusible metals satisfactorily because of insufficient protection of metal heated to dangerous temperatures.

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SOV/135-59-5-2/21

Methods of Welding Active Metals

Welding with gas protection in small mobile chambers (Fig 1), each chamber fastened to an argon-arc burner, was found to be unsatisfactory. Welding with the use of hermetically sealed chambers with an inert atmosphere was then tried; for this purpose a small laboratory chamber was produced. The entire unit (Fig 2) consists of a chamber, a pre-vacuum pump, a booster pump, a control desk, a vacuum meter, and a few vacuum valves. The interior of the chamber is shown in Fig 3, from which it will be seen that in contrast to chambers of foreign design the motors for moving the articles and electrodes are housed inside the chamber, which also contains an MEI NZ-8 automatic head. Using this chamber, welded joints of some active metals of a thickness of up to 2 mm were obtained. Results were satisfactory, providing the metal and the inert gases were clean enough, but it was not possible to weld some infusible metals properly. Vacuum welding with an electron beam is then discussed. In this method, the surface of the metal to be welded is bombarded with fast-moving electrons in a high vacuum, the resultant heat being used to fuse the

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SOV/135-59-5-2/21

Methods of Welding Active Metals

metal. The device used is shown schematically in Fig 5. It consists mainly of a vacuum chamber containing an electron gun (designed by Candidate of Technical Sciences N. G. Sushkin) consisting of a cathode in the form of a wolfram spiral, the anode being the article to be welded. The entire unit is shown in Fig 6. The vacuum chamber is 600 mm in diameter and 1 metre long. In its upper part are the electron gun and the vacuum electric lead, the vacuum system being placed beneath the chamber. The electron gun (Fig 7) can create a powerful electron beam with a voltage of up to 100 kv. It consists of a chamber on which a three-petticoat insulator is attached. The insulator contains the holder of the cathode, placed in the center of the chamber. Under the cathode is the first anode with a hole for the electron beam, the article itself being the second anode. In this chamber, specimens of very active metals of up to 2 mm thickness were welded; the vacuum was 10-4 mm of mercury column, voltage at the cathode 25 kv, the current of the electron beam reached 40 ma, speed of welding 5 metres per hour, power of the electron beam 1000

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Methods of Welding Active Metals

watts. The seams were found to be of high ductility and free of any defects. The positive factors of welding by an electron beam in a vacuum are summarized as follows: 1) absence of electrodes; 2) high degree of vacuum; 3) absence of influence of external forces; 4) possibility of wide regulation of the temperature and concentration of the source by a focusing lens; 5) possibility of obtaining any temperature in the anode spot; 6) possibility of removing volatile admixtures from the metal; 7) high welding speed. It is suggested that this method could be widely used in the fabrication of vacuum devices. There are 5 photos, 2 diagrams and 3 English-language references.

ASSOCIATION: MVTU im. Baumana (MVTU imeni Bauman)

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MORDVINTSEVA, A., kand. tekhn. nauk; OL'SHANSKIY, H., kand. tekhn. nauk

Ultrasonic welding of metals and plastics. WFO no. 6:32-33 Je '59.

(MIRA 12:9)

(Ultrasonic waves--Industrial applications)

(Welding research)

25(1,7)

SOV/125-59-8-1/18

AUTHOR:

Ol'shanskiy, N.A.

TITLE:

A Method of Electron Beam Welding in a Vacuum

PERIODICAL:

Avtomaticheskaya svarka, 1959, Nr 8, pp 3-11 (USSR)

ABSTRACT:

The article deals with the process of electron beam welding in a vacuum, an apparatus developed for that purpose, and the results obtained in working with this process at the welding laboratory of the MVTU. The author opens with a brief discussion of the nature of electron beam welding in a vacuum; 5 methods for concentrating the electron beam in order to obtain a higher concentration of energy in a smaller area of metal surface are noted, as are various deflection systems for shifting the beam so that it crosses the seam. The author prefers a magnetic deflection system (described). An apparatus for electron beam welding in a vacuum, the ELV-1, was developed at the MVTU (Fig 1), consisting of a vacuum chamber, control panel, electron gun, magnetic focusing and deflection devices, and a vacuum system, all described in some detail.

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## A Method of Electron Beam Welding in a Vacuum

The small electron gun is described and illustrated (Fig 2). It may be used for welding at voltages up to 50 kV and currents of 3-5 A. The cathode of the gun is a tungsten spiral; a superior spiral, which lasts longer and gives a more stable electron beam, uses type VT-15 thoriated tungsten wire. Describing the vacuum system the author notes that a vacuum of no less than  $5 \times 10^{-4}$  mm of Hg will guarantee a weld. When the vacuum falls to  $10^{-5}$  mm of Hg arc-over may occur making a weld impossible. Vacuum equipment includes: a VN-1 for-vacuum pump, an N5S type steam-jet pump, 2 DU-85 vacuum valves, a DU-160 vacuum lock, and 2 DU-25 inlet valves. A vacuum meter type VT-2 was used to measure the vacuum in the chamber. Using an LT-2 or LT-4M thermocouple tube the VT-2 has a range of from 1 to  $10^{-5}$  mm of Hg. High vacuum measurements were done with an LM-2 tube and a VI-3 vacuum meter, with a range of from  $1 \times 10^{-3}$  to  $1 \times 10^{-7}$  mm of Hg. A vacuum of  $1 \times 10^{-4}$  mm of Hg was guaranteed, and

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SOV/125-59-8-1/18

## A Method of Electron Beam Welding in a Vacuum

an increase of pressure to  $5 \times 10^{-4}$  mm of Hg did not disturb the normal process of welding. Electron beam welding in a vacuum is found superior to welding in a chamber with a controlled atmosphere, with respect to lack of contamination. Advantages of the system are briefly discussed by the author. The power supply for the MVTU-MEI apparatus is described and illustrated (Fig 3). High voltage AC is obtained from the cathode transformer of an RUP X-ray apparatus. An interruptor is included in the primary of the HV transformer, and used to obtain pulse action of the beam for welding with certain types of metals like aluminum, magnesium and their alloys. The normal operating range during electron beam welding is 1,700 - 15,000 V. If the voltage exceeds the upper limit X-ray radiation becomes a problem unless adequate shielding is provided. It is stated that the same forms of joints may be employed with electron beam welding as in welding with a non-fusing tungsten electrode in a protective gas medium; several forms of joints are illustrated

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A Method of Electron Beam Welding in a Vacuum

(Fig 4). Using the apparatus described samples of stainless steel, copper, molybdenum, zirconium and other metals up to 2 mm in thickness were successfully welded; a vacuum of  $10^{-4}$  mm of Hg was used during welding. Results are tabulated. The author briefly discusses pulsed electron beam welding of certain metals, aluminum, magnesium and their alloys, and extremely thin metals. Comparative metallographic studies and measurements of the firmness of the metal in welded joints of zirconium were made for a controlled argon atmosphere and a vacuum. Results are described and illustrated (Figs 5, 6). In conclusion the author mentions a number of advantages provided by this method of welding, stressing the purity and high quality of welds obtainable through isolation from contaminating matter in the atmosphere, and adds that electron beam welding is becoming a widely used method in industry. Electronic heating in a vacuum, he states, can also find broad application in industry, not only

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A Method of Electron Beam Welding in a Vacuum

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for welding and fusing of metals, but as well for soldering during processing (e.g. annealing and tempering); electron beam heating is quicker and gives a better solder joint. There are 4 photographs, 2 drawings, 1 schematic diagram, 1 table, 1 graph and 4 references, 1 of which is Soviet and 3 English.

ASSOCIATION: MVTU imeni Bauman (MVTU imeni Bauman)

SUBMITTED: March 13, 1959

Card 5/5

15(8)

SOV/135-59-9-11/25

AUTHORS: Ol'shanskiy, N. A. and Mordvintseva, A. V., Candidates  
of Technical Sciences

TITLE: Supersonic Welding of Plastics

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 9, pp 30-33 (USSR)

ABSTRACT: The authors present some facts on a new method of welding plastics. This method has been worked out in 1958 by the Department "Svarochnoye proizvodstvo" (Welding Production) of MVTU under the supervision of the Corresponding Member of the Academy of Building and Architecture G. A. Nikolayev. The method is based on the use of supersonic vibrations. In supersonic welding the magnetostrictive effect is used, concluding in the change of the dimensions of ferromagnetic materials under the influence of an alternating magnetic field. The following materials can be used for magnetostrictive appliances: nickel, stainless steel, and some alloys: "Permendyur" and "Permalloy". Positive results of investigations on supersonic welding made by MVTU and MEI were used [Ref 1 and 2]. On samples of "Vini-

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SOV/135-59-9-11/23

### Supersonic Welding of Plastics

plast" and organic glass, with a thickness up to 10 mm, lap joints and T-shaped joints were welded. The conditions are shown in the table. Fig 5 shows the machine type PUT-2 for supersonic spot welding and press welding of plastics, constructed at the MVTU. The advantages of supersonic welding are not within sight yet, but so far it can be said, that the heat concentration on the welded spot exclusively, leads to a high productivity, small energy waste and little changes of the material qualities. Furthermore the welding can be done at sections of different shape and at places which are hard to get at, Engineer L. N. Skorokhodov participated in parts of this study. There are 3 photographs, 2 drawings, 2 graphs, 1 table and 2 Soviet references.

ASSOCIATION: MEI (N. A. Ol'shanskiy) and MVTU imeni Bauman (MVTU imeni Bauman (A. V. Mordvintseva)

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S/125/60/000/010/005/015  
A161/A133

12300 also 1573

AUTHORS: Ol'shanskiy, N.A., Mordvintseva, A.V.

TITLE: Welding Commercial Molybdenum in Inert Gas

PERIODICAL: <sup>13</sup>Avtomaticheskaya svarka, 1960, No. 10, pp. 36-40

TEXT: Sintered and cast molybdenum was welded in argon with tungsten electrodes. The results of the experiments are given in the article. The formation of cracks made it impossible to obtain well-welded joints in sintered molybdenum in an argon filled chamber. To prevent any contact with air, welding was performed in a sealed chamber already described (Ref.1). The addition of tantalum and titanium as deoxidizing agents proved effective. Foils of these metals were laid between the molybdenum sheet edges. The chamber was hermetically sealed prior to welding, and a  $10^{-4}$  mm Hg vacuum produced inside. Argon was fed into the chamber whilst the vacuum pumping went on, the vacuum system was switched off at 1.1 atm argon pressure in the chamber. The arc was ignited by an oscillator. A thoriated tungsten electrode 2.8 mm in diameter, and current of 75-80 amp and 9 v were used. Welds done with Card 1/5

Welding Commercial Molybdenum in Inert Gas

S/125/60/000/010/005/015  
A161/A133

tantalum foil had no cracks but pores, apparently caused by the evaporation of tantalum, developed on the surface. The titanium foil gave good quality but very brittle welds. Flawless and bright welds were obtained in cast molybdenum without the above mentioned modifiers. The weld metal (Fig.1) was coarse-grained and its strength varied between 33.3 and 50.4 kg/mm<sup>2</sup>, and was 40-50% below the base metal strength at room temperature. At 250°C the strength of both the base metal and weld metal dropped 30%. The plasticity of welds in cast molybdenum was low (bend angle 5-30°) but a short heating by electron rays in a vacuum up to 800-1,000°C increased the plasticity, while the maximum bending angles were 50-90°. The low plasticity was caused by microscopic cracks on the surface of the weld metal (Fig.6). Pickling of the base metal surface improved its plasticity, and grinding raised the plasticity of the joint to 140° bend angle. Professor G.A. Nikolayev supervised the experiments. Engineers Yu.N. Zorin and V.M. Kachalov participated in the work. There are 6 figures and 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The English-language publication reads as follows: R.E. Monroe, N.E. Weare, D.C. Martin, Fabrication and Welding of Arc-Cast Molybdenum, "Welding Journal", No.10, 1956.

Card 2/5 *Moscow Power Engr. Inst*

PHASE I BOOK EXPLOITATION

SOV/5656

Nikolayev, Georgiy Aleksandrovich, Natan L'vovich Kaganov, Nikolay Aleksandrovich Ol'shanskiy, Aleksandra Vladimirovna Mordvintseva, and Dmitriy Mikhaylovich Shashin

Novaya svarochnaya tekhnika v priborostroitel'noy promyshlennosti (New Welding Processes in the Instrument Industry) Moscow, Gosizdat "Vysshaya shkola", 1961. 110 p. 10,000 copies printed.

Ed. of Publishing House: D. Ya. Koptevskiy; Tech. Ed.: R. K. Voronina.

PURPOSE: This book is intended for students in schools of higher education and tekhnikums; it may also be used by technical personnel in the instrument industry.

COVERAGE: The principal modern methods of joining metals and non-metallic materials are discussed. The book is based on scientific research work performed by the authors, and on other investigations conducted in the USSR and abroad in recent years. Much of

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New Welding Processes (Cont.)

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the material was obtained from experimental investigations conducted in the welding laboratory of the MVTU (Moskovskoye vyssheye tekhnicheskoye uchilishche -- Moscow Higher Technical School) and at the Moskovskiy energeticheskiy institut ... (Moscow Power Engineering Institute.) The introduction was written by Professor G. A. Nikolayev, Doctor of Technical Sciences; Section 3, 5, and 6 are by N. A. Ol'shanskiy; Section 2 is by D. M. Shashin; Section 4 is by N. L. Kaganov; and Section 7 is by A. V. Mordvintseva. No personalities are mentioned. References accompany some of the chapters. There are 37 references: 33 Soviet and 4 English.

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AKULOV, A.I.; YEVSEYEV, G.B.; KAGANOV, N.L.; KURKIN, S.A.; LYUBAVSKIY,  
K.V.; MORDVINTSEVA, A.V.; NAZAROV, S.T.; NIKOLAYEV, G.A., doktor  
tekh.nauk, prof., zaslužennyy deyatel' nauki i tekhniki;  
OL'SHANSKIY, N.A.; CHANGLI, I.I., red.; STEPANCHENKO, N.S., red.  
izd-va; EL'KIND, V.D., tekhn.red.

[Current welding practices] Sovremennoe sostoyanie svarochnoi  
tekhniki. Sovmestnoe izdanie Mashgiz, SNTL, 1961. 318 p.

(MIRA 14:6)

(Welding)

22021

15.8700 *2708 1573* :

S/145/61/000/003/006/006  
D211/D304

AUTHORS: Mordvintseva, A.V., and Ol'shanskiy N.A., Candidates  
of Technical Sciences

TITLE: Methods of welding plastics

PERIODICAL: Izvestiya vysshykh uchebnykh zavedeniy,  
mashinostroyeniye, no. 3, 1961, 96 - 108

TEXT: The most widely used methods, including welding by ultra-sonics, are described and discussed. All of them depend on heating the parts which are to be joined. Thermosetting plastics (bakelite, ebonite, textolite, etc.) decompose on heating and, therefore, are unsuitable for welding. Components are formed from them in their final shapes or can be joined mechanically or bonded with adhesives. Thermoplastics soften on heating without decomposition or permanent loss of properties. These are manufactured into semi-products (sheets, rods, profiles, tubes) which can be formed or wel-

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Methods of welding plastics

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ded on heating. Welding takes place under pressure within certain temperature limits between the temperatures of softening and of decomposition. Methods of welding can be classified as follows: 1) By ultrasonics: spot or press (step, contour) welding; 2) By high frequency currents: spot, seam, press welding; 3) By gaseous heating medium; 4) By heated elements: hot roller or strip, hot knife-edge under pressure; 5) By friction. In welding by hot air (hot CO<sub>2</sub> or N<sub>2</sub> for polyethylene) a torch similar to that in oxyacetylene welding and a filler rod of the same plastics are used. The torch has an electric or gas heating element, by which gas passing at the pressure of 1.0 to 1.5 kg/cm<sup>2</sup> is heated to 200 - 270°C. In butt welding of plates up to 5 mm thick the chamfer angle should be 60°. Thicker plates should be chamfered and welded on each side and the chamfer angle should be 70 - 90°. This method of welding is slow, cannot be easily automated and results in reduced properties of the weld due to possible overheating and internal stresses,

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# Methods of welding plastics

arising from the high coefficient of thermal expansion of plastics. Welding under pressure without a filler rod is illustrated. The plates are heated on each side immediately in front of the rollers by a stream of air at 250 - 300°C. Butt welding by means of a heated knife-edge is also illustrated. Welding by friction is readily used for tubes, rods and other rotating bodies. Surfaces to be welded are melted by friction and pressed together. Experiments have shown that for its specific applications, this method is very efficient, economical and gives good quality welds. High frequency welding is based on heating plastics in a high frequency electric field applied by special electrodes which also serve to exert the necessary pressure. Since most plastics are good dielectrics, the system acts like a condenser. Heat is generated uniformly over the whole thickness by molecular friction caused by reversals of the field. Currents of 30 to 40 megacycles/sec are used. This method gives high quality welds and can be easily automated. At present, special machines exist for spot and seam welding by this method of sheets and strips of up to 5 mm thick. The speed of welding is high

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(27 to 65 m/hr). For press welding, electrodes are interchangeable to give the required size and configuration of the seam. Highly dielectric plastics like polyethylene POV-50 cannot be welded by this method. It has to be sandwiched between sheets of polychlorvinyl which acts as a heating material. Fluorplastic is an exception among thermoplastics. It can work at temperatures up to 350°C and is highly resistant to corrosion attack (it resists aqua regia). It cannot be welded by any of the methods described. Only sheets up to a total thickness of 0.5 mm can be welded under pressure at 370 to 380°C. A new method of welding plastics by ultrasonic vibrations was worked out in 1958 by the Kafedra svarochnogo proizvodstva (Department of Welding Production) at MVTU together with MEI (Moscow Power Engineering Institute) under the direction of Professor G.A. Nikolayev. The term ultrasonics here means vibrations above 20 kc/sec. A magnetostriction effect of ferrous metals is used to convert a high frequency magnetic field into elastic vibrations (longitudinal) of a vibrator rod. By this method, mechanical vibrations of up

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Methods of welding plastics

to 100 kc/sec can be obtained. Fig. 8 shows a machine for welding plastics by ultrasonics.

Fig. 8. Scheme of equipment for welding plastics by ultrasonics.

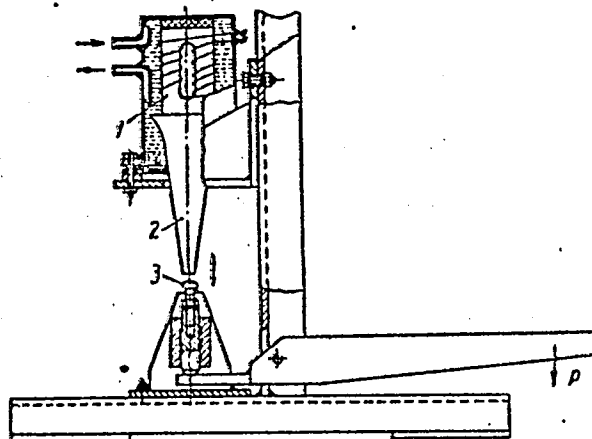


Fig. 8.

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Рис. 8. Схема установки для сварки пластмасс ультразвуком

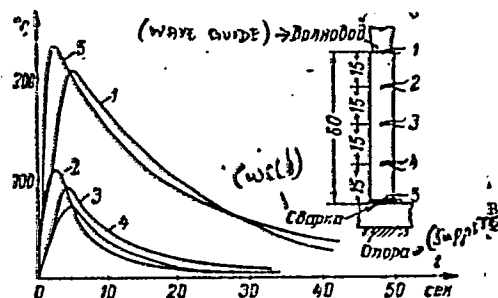
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The job is put between the vibrator rod 2 and jaw 3. Pressure (60 to 80 kg/cm<sup>2</sup>) is applied together with vibrations (20 kc/sec and 15 to 20  $\mu$  amplitude). Welding takes place in a very short time and only the contact surfaces are heated giving a very high quality weld. The length of the process depends on the thickness and properties of the plastic and can be varied by means of an electronic relay from 0.1 to 8 sec. Fig. 11 shows how temperature varied at various points during welding of two rods 10 x 10 and 60 mm long.

Fig. 11.



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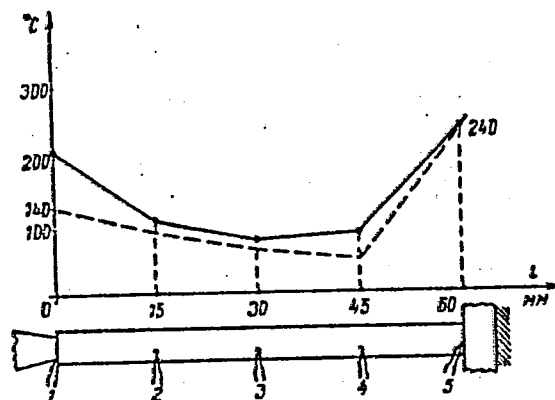
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Maximum temperature distribution along the rod is shown in Fig.12.

Fig. 12.



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The full line corresponds to the process duration of 5 sec and broken line to 2 sec. Tests proved that 2 seconds were sufficient for this welding. It was also found that in welding 2.2 mm thick sheets of SNP the strength of the weld was nearly the same as of the parent material for times of welding from 2 sec upwards. Engineer L.N. Skorokhodov participated in this work. There are 15 figures, 1 table and 5 Soviet-bloc references.

ASSOCIATION: MYTU im. N.E. Bauman (Moscow Technological College  
(MYTU) im. N.E. Bauman)

SUBMITTED: June 7, 1960

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S/125/61/000/003/001/016  
A161/A133

AUTHOR: Ol'shanskiy, N.A.

TITLE: On the problem of joint formation in ultrasonic welding

PERIODICAL: Avtomaticheskaya svarka, <sup>14</sup>no. 3, 1961, 3 - 11

TEXT: The article presents a discussion of the results of experiments with ultrasonic welding in an attempt to find an explanation of phenomena resulting in the formation of solid joints in this process. References are made to publications showing different opinions of Soviet and non-Soviet authors as to what is the major factor in the process. Copper, aluminum, ~~Al~~6AT (D16AT) duralumin and other metals were welded on a VT-4 (UT-4) ultrasonic spot welding machine. The joints were tested under shearing load and tension, and the microstructure was examined. Short application of ultrasound, below 0.5 sec, had no welding effect, but caused the formation of a spot of polished surface indicating the effect of friction. The spot increased with increased time of ultrasonic action, and seizure started in separate spots within the polished area. Microphotographs of rupture surfaces are given. For copper, 1.06 sec was sufficient to produce complete welding. The surface hardness of the polished metal layer was considerably high-

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On the problem of joint formation in ....

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er than that of the base metal. It is assumed that microscopic reciprocative motion causes friction with a destruction of oxide films, appearance of pure metal surfaces, and seizure between pure surfaces. Particularly clear results were obtained with D16AT duralumin sheets 0.3 mm deep welded with 150 kg clamping pressure, 1.0 sec welding time, and 16 micron oscillation amplitude. A macro-photograph is included showing plastic deformation in the center of the spot weld, with an only slightly perceptible line of joint. No traces of high temperature effect could be found in joints. Scratches on the surfaces obviously showed the places where the seizure started. High strength was obtained in joints where the scratches were oriented at right angles to the direction of vibration of the waveguide end. Brushing with a metal wire brush improved the strength of joints. ✓  
Engineers B.V. Amosov and A.V. Rudnitskaya took part in the investigation. There are 7 figures and 7 references: 6 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: I.B. Jones and S.I. Powers, Ultrasonic welding. Welding Journal, v. 35, no. 8, August 1956.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Power Engineering Institute)

SUBMITTED: June 3, 1960

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27804

S/549/61/000/101/001/015  
D286/D304

1.2310

AUTHORS: Ol'shanskiy, N.A., Candidate of Technical Sciences,  
Docent, and Zorin, Yu.N., Engineer

TITLE: Electron-beam welding of metals in vacuum

PERIODICAL: Vysshiye tekhnicheskoye uchilishche. Trudy. Svarka  
tsvetnykh splavov, redkikh metallov i plastmass,  
no. 101, 1961, 5 - 28

TEXT: Work on electron beam welding commenced at the MVTU in  
1958 under Professor G.A. Nikolayev, Doctor of Technical Sciences.  
The basis of this welding method was the conversion of the kine-  
tic energy of a focussed beam of rapidly moving electrons into  
heat when they bombarded the site of welding in a chamber under  
high vacuum. On heating the tungsten cathode 7 to 2300-2600°C  
thermionic emission of electrons occurred which were accelerated  
towards the anode (the work) by a high-voltage field, the accele-  
rating force being  $-eE = e \text{ grad } V$ , where  $e$  - electron charge,  $E$  -  
electrical field intensity,  $V$  - field potential. The energy of the  
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Electron-beam welding of ...

electrons depended on their speed and increased with increasing potential difference between cathode and anode. Speed =  $2\text{eV/m}$ , where  $e = 1.6 \cdot 10^{-19}$  coulomb;  $m = 9.1 \cdot 10^{-31}$  k;  $V$  - potential difference in volts. Electron focussing to concentrate the released energy could be effected by: 1) Imparting a certain shape to the focussing head, giving such a formation to the electric field that the electrons became focussed in the region near the cathode; 2) Establishing an electrostatic focussing lens, in the field of which the electrons were simultaneously concentrated and accelerated; 3) Creating a magnetic field which could constrict the electrons into a beam by means of a coil set in a massive iron casing. The prototype machine ELV-1 is then described. The electron gun and welding chamber are evacuated separately. For welding the pressure in each chamber could not fall below  $5 \cdot 10^{-4}$  mm Hg. At  $10^{-3}$  mm Hg ar~~g~~ discharges occur. Shortcomings in the design of ELV-1 became apparent on use: the location of the motor and reducing gear and also the focussing and inclining systems inside the

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Electron-beam welding of ...

chamber could impair the vacuum. The ELV-2 was therefore constructed. The welding chamber was 500 mm in diameter and 1000 mm long, welded in stainless steel. To improve the vacuum the focussing and beam-deflecting systems, electric motor, and reduction gearing were removed from the chamber. The mechanical energy required for moving the welded component was transmitted by a shaft passing through the vacuum seal. The focussing and deflecting systems were located on a stainless steel sleeve surrounding the electron gun chamber (Fig. 8). The vacuum system was the same. Fig. 9 shows the electron gun, now of smaller dimensions, which could be used for welding at up to 50 kV and 3-5A. 2 and 3 were insulators, 4 the cathode holder, and 5 the focussing head. 6 was the first anode. With this arrangement a vacuum of  $1 \cdot 10^{-4}$  mm Hg could be attained. This provides a much purer atmosphere in terms of content of reactive gases than would be obtained in a chamber filled with the purest argon obtainable. Those impurities which did remain were mostly ionized positively and therefore, tended to collect around the cathode away from the welding zone. The power sources wel-

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Electron-beam welding of ...

ding could be single or 3-phase high-voltage rectifiers or high-voltage D.C. generators. The electrical scheme is shown for supplying the electron gun from a high-voltage 3-phase rectifier. The latter is a high-voltage 3-phase transformer with delta primary connection and secondary star connection. The secondary voltage could be 0-60,000 V, and connection to six kenotrons provides current rectification. For welding metals like aluminum it is desirable to include a contact breaker in the primary circuit to give the electron beam a pulsing effect. Up to 5A current could be obtained in the secondary circuit, and thus in the anode spot on the article being welded up to 50 kW could be concentrated. At voltages above 17,000 X-rays were produced which could penetrate the chamber walls if insufficiently thick. In the ELV-1 a lead lining and leaded glass were used. For supply of power to the ELV-2 a type V-10-100 rectifier was used, working as a full-wave rectifier with four type V-236 rectifiers. Voltage smoothing was effected with a  $\Pi$ -shaped filter. The effect of the main welding parameters (anode voltage, beam current, power, displacement, and

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Electron-beam welding of ...

welding speed) on fusion width and depth were investigated on 5 mm thick stainless steel 1 Kh18N9T. Details of the successful welding of a number of metals in the ELV-1 apparatus are tabulated. The vacuum was 10<sup>-4</sup> mm HG. For welding 0.75-2 mm thick zirconium or zirconium alloy without edge flanging or filler material the following conditions were used: Beam current 10-35 mA, voltage 26-38 kV, power in beam 550-900 W, welding speed 8-9 m/hr. Bead width was 3-6 mm. The current pulsing technique was necessary for Al, Mg, and their alloys (owing to the surface oxide film) and was useful for welding extremely thin metals. Welds were found to be defect-free and to possess high ductility. Weld hardness of zirconium was only half that found in a similar weld made in an argon-filled chamber and was nearly the same as that of the heat-affected parent metal. There are 23 figures, 1 table and 5 references: 2 Soviet-bloc and 3 non-Soviet-bloc. The references to the English-language publications read as follows: J.A. Stohr and Briola, Vacuum welding of metals, Welding and Metal Fabrication, 1958, No. 10, 336-370; W.L. Wyman, High-vacuum electron-beam fusion welding, Welding Journal, 1958, V37, No. 2, 49-53; G. Burton,

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Electron-beam welding of ...

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D256/D304

R.L. Matchett, Electron-beams new technique for welding, Metal  
working Production, May 1959.

ASSOCIATION: Moskovskoye vissheye tekhnicheskoye uchilishche im.  
Baumana (Bauman Moscow Higher Technical College)

Card 6/36

1.2300

27805  
S/549/61/000/101/002/015  
D256/D304

AUTHORS: Ol'shanskiy, N.A., Candidate of Technical Sciences,  
Docent, and Mordvintseva, A.V., Candidate of Technical  
Sciences

TITLE: Fusion welding of technical molybdenum

PERIODICAL: Vyssheye tekhnicheskoye uchilishche. Trudy. Svarka  
tsvetnykh splavov, redkikh metallov i plastmass,  
no. 101, 1961, 29 - 47

TEXT: The authors first review western literature on the gas-  
shielded arc and resistance welding of molybdenum, then examine  
work carried out at MVTU on welding sintered and cast molybdenum  
by various methods of shielding the metal with an inert gas, and  
also electron-beam welding. The metal used was very variable in  
quality and properties, even within the same sheet. The edges  
were straightened to eliminate gaps, abraded with emery cloth for  
a width of 25-30 mm until bright, and cleaned with acetone. Weld-  
ing was carried out in a stainless steel clamping device. The di-  
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Fusion welding of technical ...

ensions of the backing bar groove would give an unsupported bead. Welding was parallel with the rolling direction. For chamber welding, two grades of argon were used: High purity, with 0.003 % O<sub>2</sub> and 0.03 % N<sub>2</sub>, and grade 1, with 0.05 % O<sub>2</sub> and 0.23 % N<sub>2</sub>. Technical helium was also used. With specimens in place the chamber was evacuated to 10<sup>-4</sup> mm Hg and refilled with argon to 1.1 atm. A 2.85 mm dia. thoriated tungsten, 75-80A current, 8 arc volts, and welding speed of 6.2 m/hr were used on 1.1 mm sheet. In all specimens irrespective of argon purity or welding conditions, longitudinal weld cracking occurred. The deoxidation product was non-volatile, did not wet the grain boundaries or form films, and was more refractory than the molybdenum. Only titanium met all these requirements, and when added as foil placed between the abutting edges it gave crack-free welds of good appearance. Some grain refinement resulted, although the grain size was still relatively large and seemed little affected by sheet gauge. Typical hardness surveys are given. Under the welding conditions given above a weld bead 4 mm wide at top and bottom was obtained on 1.1 mm sheet in (pre-

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Fusion welding of technical ...

sumably) grade 1 argon: a range of sheet thickness (0.55 - 2 mm) was used in this gas. Only 1 mm sheet was welded in high purity argon, and the limited comparison possible suggested that a higher current was here required. The effect of heat treatment was investigated by heating specimens in a furnace and in resistance welding machines. For the former the specimens were hermetically sealed in containers with Zr turnings. Heating for longer than a minute sharply reduced the ductility of weld and parent metals, giving a bend angle of  $0-3^{\circ}$  (at room temperature). With regard to electron-beam welding experiments confirmed an initial assumption that a considerable quantity of the volatile  $MoO_3$  present in the metal would be removed on heating under vacuum. Welds were obtained in sintered molybdenum which were crack-free, but possessing low ductility. Most of the work was, however, carried out on cast molybdenum, when a stable welding process and good weld formation were obtained, with a smooth transition from weld to parent metal, bright weld and absence of temper colors alongside the weld. Hardness surveys and tensile strength properties are given. In room

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Fusion welding of technical ...

temperature bend testing the ductility was as low as in the chamber-welded specimens (10-20 bend angle). On raising the testing temperature the bend angle increased. Surface polishing also increased the bend angle to 26-41. Prolonged heating at 1000° had no effect. Short-duration heating in the electron beam improved the weld metal ductility, although here again the results varied between specimens. Since the high-temperature properties were important, practically, these were measured in short-time tests, in which the specimens were heated by electric current passage in a special machine having a mechanism for recording the force-time curve. Flat specimens with a reduction in section at the center were used. Temperature was measured by a Pt - Pt - Rh thermocouple. High purity argon shielded the heated region against oxidation. In the conclusions, note was again taken of the variable and sometimes poor sheet quality. In all welding methods there was a sharp fall in the ductility in the heat-affected zone. Sintered molybdenum could be tungsten-arc welded without cracking if titanium deoxidation was used. Cast molybdenum could be welded without

W

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1.2310 (2408)

27806  
S/549/61/000/101/003/015  
D256/D304

AUTHORS: Ol'shanskiy, N.A., Candidate of Technical Sciences,  
Docent, and Krumbol'dt, M.N., Candidate of Technical  
Sciences

TITLE: Ultrasonic spot-welding and aluminum alloys

PERIODICAL: Vyssheye tekhnicheskoye uchilishche. Trudy. Svarka  
tsvetnykh splavov, redkikh metallov i plastmass,  
no. 101, 1961, 49 - 99

TEXT: Two methods of introducing ultrasonic vibrations into the  
welded joint are shown in Figs. 1 and 2. The device shown in Fig.  
1 is simple in design, reliable in operation and amenable to ma-  
thematical analysis. The direct power transmission means that no  
limitations are imposed, and equipment can be planned for heavy-  
gauge welding. In principle the device can be used for continuous  
seam welding if the welding stub is made annular and the genera-  
tor block rotates about the longitudinal axis. However, the reso-

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